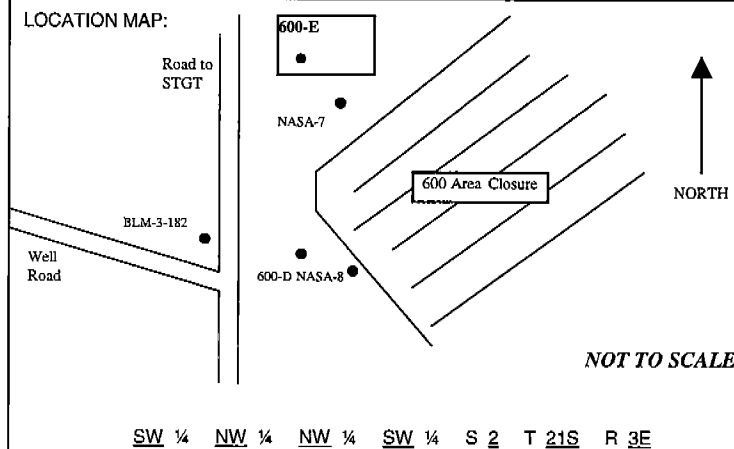


LITHOLOGIC LOG

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LOCATION MAP:



SITE ID: NASA-WSTF LOCATION ID: 600-E (Westbay)

SITE COORDINATES (ft.):

N: 224792.43 E: 413630.40

GROUND ELEVATION (ft. MSL): 4746.17

STATE: New Mexico COUNTY: Dona Ana

DRILLING METHOD: Mud Rotary/ Air-Foam Hammer

DRILLING CONTR.: Stewart Brothers Drilling Co.

DATE STARTED/COMPLETED: 09/23/97 - 10/10/97

FIELD REP.: Giles/Pearson/Egan/Canavan

COMMENTS: Lithlog compiled by M. Canavan. Drilled Mud

rotary, 9 7/8" hole, 0'-151'. Installed 6" surface casing to 150'.


Air-foam hammer, 4 1/2" hole, 151'-701' (TD). DTW = 273.5'

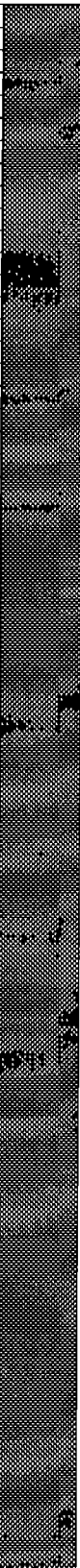
Top of Andesite Bedrock at 150'.

LOCATION DESCRIPTION:


Depth	Visual %	Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description
10	+		21	Grab Cuttings every 10' 0'-701'	0' - 140': ALLUVIUM (Santa Fe Group): Unit is comprised of silt- to gravel-sized (up to 2.0 cm) clasts with clay intervals present where noted. Sample color ranges from pale yellowish brown (10 YR 6/2) to medium gray (N5) with individual clast color being highly variable. Clasts/cuttings may be well rounded to angular and sorting is poor to moderate. Caliche coating on clasts is prevalent from 0-20', 70'-80', and 100'-120'. 130'-140' sample shows evidence of localized cementation of angular lithic clasts. The Santa Fe Group Alluvium is a consolidated to unconsolidated, moderately to poorly sorted, polygenetic pebble to boulder conglomerate. Sedimentary lithologies represented are highly variable and include medium light gray (N6) to medium dark gray (N3) micritic to crystalline and slightly fossiliferous limestone; pale olive (10 Y 6/2) to red laminated siltstones; fine-grained quartz and lithic arenites, cherts, and clays. Igneous lithologies are equally variable and include fine- to coarse-grained granites, very pale orange (10 YR 3/4) to dark reddish brown (10 R 3/4) rhyolite porphyries; and several miscellaneous felsic igneous rock types. Also present are a variety of quartzites, quartz, feldspar, and biotites.
20	+		46		0'-30' Bimodal samples (2-5 mm and 0.75-1.5 cm)
30	+		6		30'-70' Clay percentage increases. Clay is light brown (5 YR 6/4) to moderate brown (5 YR 4/4)
40	+		20		30'-40' Finer grained sample. Silt to gravel (≈1.0 cm) size grains. Subangular to rounded.
50	v		75		
60	v		75		
70	=		13		
80	+		40		
90	+		120		
100	+		25		100'-130' 5% Clay

Depth	Visual %										Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description
110	+	+	+	+	v	v	v	//	::			120	Grab Cuttings every 10' 0'-701'	
120	+	+	+	+	v	v	v	//	::			26		
130	+	+	+	+	v	v	v	//	::			75		130'-140' Calcareous cementation in 10% of cuttings. Angular to subangular.
140	+	+	+	v	v	v	//	::		=		11		140'-150' VOLCANIC RICH ALLUVIUM : Andesitic fine sand and gravel.
150	v	v	v	v	v	v	v	v	v	+		24		140'-701' ANDESITE (Oregon): Blackish red (5 R 2/2) to pale purple (5 RP 6/2) with altered zones of pale green (10 G 6/2) to grayish green (5 G 5/2) and iron oxidized clasts and individual mafic minerals and lithic fragments of moderate reddish orange (10 R 6/6) to moderate reddish brown (10 R 4/6). Formation ranges from a microporphyritic andesite through a well-sorted volcanic sandstone, semi-to unconsolidated volcanoclastic sand, to a volcanic breccia comprised of a variety of andesitic to dacitic rock types. Andesitic aphanitic groundmass comprises 10% - 60% of a unit and may be difficult to discern in clastic zones. Plagioclase and hornblende phenocrysts are ubiquitous but range from 10% - 40% of composition and may be anhedral to euhedral. Flow alignment is evident in some units. Volcanoclastic units include angular to rounded quartz feldspar and lithic fragments and andesite xenoliths.
160	v	v	v	v	v	v	v	v	v	=		43		150'-170' Highly altered andesite. Fine sand and gravel. Rounded clasts are moderately to very friable and partially altered to clay. Color is grayish pink (5 R 8/2).
170	v	v	v	v	v	v	v	v	v	=		26		170'-180' Trace white fracture filling calcite. Patches of clay alteration on subangular cuttings.
180	v	v	v	v	v	v	v	v	v	=		40		180'-220' Grayish red (5 R 4/2) to grayish red purple (5 RP 4/2) and grayish pink (5 R 8/2) cuttings show clay alteration on surfaces that increases with depth, giving them a dusty appearance. Cuttings are subangular to subrounded and sample is alluvial in appearance. Friable cuttings probably rounded easily. Andesite (possibly a litharenite mudflow) is finely porphyritic with 10-20% plagioclase and 10% hornblende phenocrysts altering to limonite.
190	v	v	v	v	v	v	v	v	v	v		26		220'-300' Finely porphyritic andesite, 30%-40% phenocrysts with some groundmass. Mafic phenocrysts showing rims or complete alteration to limonite. Samples somewhat friable. Trace calcite fracture fill.
200	v	v	v	v	v	v	v	v	v	v		75		
210	v	v	v	v	v	v	v	v	v	v		30		
220	v	v	v	v	v	v	v	v	v	v		30		
230	v	v	v	v	v	v	v	v	v	v		60		
240	v	v	v	v	v	v	v	v	v	v		30		

Depth	Visual %	Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description
250	v v v v v v v v v v		43	Grab Cuttings every 10' 0'-701'	<p>300'-350' Subtle color change to dusky blue (5 PB 3/2) to very dusky red purple (5 RP 2/2) indicating less alteration. Irregular anhedral quartz phenocrysts or vug fill. Dense aphanitic micro-porphyry.</p> <p>310'-320' Altered zone. 30% clay.</p> <p>350'-400' Andesite porphyry. Up to 40%-50% anhedral to euhedral white feldspar phenocrysts with varying stages of alteration of groundmass and mafic phenocrysts. Healed minute fractures. Dense and angular cuttings.</p> <p>360' 5% calcite fracture fill.</p>
260	v v v v v v v v v v		25		
270	v v v v v v v v v =		46		
280	v v v v v v v v v v		33		
290	v v v v v v v v v v		43		
300	v v v v v v v = = =		29		
310	v v v v v v v = = =		10		
320	v v v v v v v v v v		30		
330	v v v v v v v v v v		14		
340	v v v v v v v v v v		40		
350	v v v v v v v v v v		22		
360	v v v v v v v v v v		24		
370	v v v v v v v v v v		370'-700' not available		
380	v v v v v v v v v v				

Depth	Visual %										Lith	Drilling Time Scale: min	Sample Type and Interval	Lithologic Description
390	v	v	v	v	v	v	v	v	v	v			Grab Cuttings every 10' 0'-701'	
400	v	v	v	v	v	v	v	v	v	v				
410	v	v	v	v	v	v	v	v	v	v				
420	v	v	v	v	v	v	v	v	v	v				
430	v	v	v	v	v	v	v	v	v	v				
440	v	v	v	v	v	v	v	v	v	v				
450	v	v	v	v	v	v	v	v	v	v				
460	v	v	v	v	v	v	v	v	v	v				
470	v	v	v	v	v	v	v	v	v	v				
480	v	v	v	v	v	v	v	v	v	v				
490	v	v	v	v	v	v	v	v	v	v				
500	v	v	v	v	v	v	v	v	v	v				
510	v	v	v	v	v	v	v	v	v	v				
520	v	v	v	v	v	v	v	v	v	v				

[illegible]

Depth	Visual %										Lith	Drilling Time Scale: ft/hr	Sample Type and Interval	Lithologic Description
670	v	v	v	v	v	v	v	v	v	v			Grab Cuttings every 10' 0'-701'	
680	v	v	v	v	v	v	v	v	v	v				
690	v	v	v	v	v	v	v	v	v	v				
700	v	v	v	v	v	v	v	v	v	v				701' Total depth of borehole.
710														
720														
730														
740														
750														
760														
770														
780														
790														
800														